

Applicant : Kimihiro Yamashita
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REMARKS

Claims 1-3 have been amended, and claims 4-21 have been cancelled. Accordingly, claims 1-3 are pending in the application.

The claimed invention relates to a method for more effectively controlling cell growth, inhibition of cell growth, activation or deactivation of a microorganism, such as bacteria, viruses, fungi, etc. The method involves first providing a ceramic material having N-surfaces and P-surfaces, which are created by a polarization treatment, typically involving the application of a voltage of from 10 to 100,000 volts per centimeter to the ceramic material in an atmosphere of steam and at a temperature up to 1000°C. The resulting polarization treated ceramic material has a high affinity for biomaterials and is capable of inducing and/or facilitating a more rapid growth, a more rapid growth inhibition, more rapid activation or more rapid deactivation of microorganisms by providing an environment conducive to bringing the microorganism and controlling agents into effective temporal proximity with each other.

Rejections Under 35 U.S.C. §112

Claims 1-3 have been rejected under 35 U.S.C. §112, second paragraph, on grounds that the claims fail to particularly point out and distinctly claim the subject matter. In particular, the Examiner has objected to the expressions "which is formed" and "decreasing . . . cells, bacteria, viruses or fungi" in claim 1. The Examiner has also requested that claim 3 be amended to include the phrase "in the form of a" before "powder, fiber, or a coating film."

In response to the rejection, Applicant has amended claim 1 to delete the language which the Examiner regards as indefinite. More specifically, claim 1 has been amended to specify that the method involves providing a ceramic "having an N-surface and a P-surface that were formed by treating the ceramic by polarization," thereby clarifying that the N-surface and the P-surface were formed during the polarization treatment. Claim 1 has also been amended to more clearly describe the method steps of providing a ceramic having a N-surface and a P-surface, adsorbing a microorganism on one of the N-surface or the P-surface, and contacting the adsorbed microorganism with a controlling agent.

Claim 3 has been amended specifically as requested by the Examiner.

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It is believed that the above amendments overcome the grounds for rejection under 35 U.S.C. §112.

Prior Art Rejection

Claims 1-3 have been rejected under 35 U.S.C. §102(b) as being anticipated by Moriya et al. (Medline Abstract). Briefly, the Examiner has stated that the reference anticipates the claims because it “teaches the stimulation of bone, which would include the stimulation of osteoblast, on a hydroxyapatite surface and would read limitation of growing cells recited in claim 1.” Further, the Examiner has stated that “the electrical stimulation would polarize the surface.”

Applicant respectfully submits that the claims as amended clearly distinguish over the teachings of Moriya et al. More specifically, the Moriya et al. reference discloses an electrical stimulation method that utilizes direct current applied from electrodes embedded in biological tissue. Polarization of the implant cannot occur because the current is applied while the implant is embedded in living tissue. The conditions needed to cause polarization of the surfaces of the ceramic while it is embedded in living tissue would cause damage to the living tissue. Therefore, the method of Moriya et al. is quite different from the claimed invention which requires use of a polarized ceramic material having an N-surface and a P-surface.

Unlike the method described in the Moriya et al. reference, the claimed invention does not involve electrical stimulation in living biological tissues, but instead involves adsorption of microorganisms on a ceramic having an N-surface and a P-surface that were formed by treating the ceramic by polarization. Therefore, the Moriya et al. reference does not teach or suggest the claimed invention.

Kobayashi Reference

The Examiner has not rejected any of the claims based on the teachings of Kobayashi, but has stated that it is pertinent to Applicant's disclosure. Similar to the claimed invention, the Kobayashi reference describes a method for controlling cell growth on surfaces of hydroxyapatite ceramics that are polarized and implanted in bone tissue. However, the Kobayashi reference fails to disclose a method to control cell growth on P-surfaces of

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implanted ceramics. Further, it is noted that Applicant claims priority to Japanese Patent Application 11-77089 filed March 23, 1999, approximately seven months before the publication date of the Kobayashi reference. Therefore, the Kobayashi reference does not constitute prior art against the claimed invention.

Examiner Interview

A interview was held on February 11, 2003 between the Examiner, Anish Gupta, and Applicant's attorney, Kevin Grzelak, at the United States Patent and Trademark Office. Claims 1-3 were discussed in view of the applied prior art reference, Moriya et al. The interview summary indicates that the above amendments overcome the § 112, second paragraph issues and avoids the art rejection made under Moriya. The Examiner requested that claims 2 and 3 be amended to provide proper antecedent basis. Specifically, the Examiner requested that Applicant amend the preambles of claims 2 and 3 to correspond with claim 1. This has been accomplished with the above amendments, wherein the words "for controlling organisms" have been deleted. Further, the Examiner requested that Applicant identify support in the specification for the word "microorganism." Such support is provided, for example, at page 8, last paragraph, which in reference to the claimed method for controlling growth, inhibition of growth, activation or inactivation of bacteria, viruses or fungi, states that the controlling behavior "may be different depending on the type of microorganisms." Thus, there is clear support in the specification for the claimed method of controlling microorganisms.

Attached hereto is a marked-up version of the amendments to claims 1-3, with deletions bracketed and additions underlined.

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CONCLUSION

In view of the above amendments and remarks, it is respectfully submitted that the application is in condition for allowance and notice of the same is earnestly solicited.

Respectfully submitted,

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Date

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

In the Claims:

Claims 1-3 have been amended as follows:

1. (Amended) A method for controlling [organisms which comprises growing, decreasing, activating or inactivating cells, bacteria, viruses or fungi at] growth, inhibition of growth, activation or inactivation of a microorganism, comprising:
providing a ceramic having an N-surface and a P-surface [of a ceramic which is] that were formed by treating the ceramic by polarization;
adsorbing on at least one of the N-surface and the P-surface a microorganism; and
contacting the adsorbed microorganism with one or more agents selected from growth
promoting agents, growth inhibiting agents, activating agents and deactivating agents.
2. (Twice Amended) A method [for controlling organisms] according to [Claim] claim 1, wherein the ceramic is a material or a combination of materials selected from hydroxyapatite ceramics, barium titanate ceramics, strontium hydroxyapatite ceramics, hydroxyapatite ceramics containing calcium or strontium as solid solutions, lithium niobate ceramics, sodium niobate ceramics, potassium niobate ceramics, glasses and crystallized glasses which contain calcium phosphate, stabilized and partially stabilized zirconia ceramics, ion conductive alumina (so-called β -alumina) ceramics, and piezoelectric ceramics containing lead.
3. (Twice Amended) A method [for controlling organisms] according to claim 1, wherein the ceramic is in the form of a powder, fiber, bulk or a coating film.